produce] such that said structure produces a photonic mode having a lasing threshold and being of a predetermined frequency, and a plurality of additional photonic modes of different frequencies, wherein said predefined amplitude is selected such that said predetermined frequency [photonic mode being separated from a nearest lower frequency photonic mode by an frequency greater than determined in accordance with] is greater than a value determined by a following expression:

$$F_L + c/2TN,$$

wherein F_L is a frequency of a nearest lower frequency photonic mode of said plural additional photonic modes, and c is the speed of light in a vacuum;

a light-emitting medium disposed within said periodic structure, said light-emitting medium being configured to [emit electromagnetic radiation at said predetermined frequency] produce optical gain when subjected to excitation; and

variable excitation means, connected to said periodic structure, for exciting said light-emitting medium to produce said optical [applying] gain of a predetermined gain magnitude in [to] said periodic structure, said predetermined gain magnitude being sufficient to meet said lasing threshold [gain ranging from a lower gain to a higher gain and for causing said light-emitting medium to emit electromagnetic radiation in accordance with the magnitude of said gain when said gain exceeds a predetermined lasing threshold, such that wide-area coherence lasing] to cause laser emission of a predetermined area to occur at said predetermined frequency [occurs] in a direction perpendicular to at least one of said top and said bottom surfaces [said layered structure], wherein said predetermined area remains coherent during the single mode lasing when predetermined gain magnitude is selectively increased above said lasing threshold.

4. (Amended) The laser apparatus of claim 1, wherein said light-emitting medium is

Received from < 718 504 4086 > at 4/15/03 11:10:37 PM [Eastern Daylight Time]

composed of a material adapted to [emit electromagnetic radiation] produce optical gain inside said periodic structure upon application of an electromagnetic wave thereto, and wherein said variable excitation means comprises an electromagnetic wave source configured to apply said electromagnetic wave to said periodic structure to excite said light-emitting medium to [emit electromagnetic radiation] produce optical gain.

6. (Amended) The [chiral] laser apparatus of claim 5, wherein said light-emitting medium comprises one of: rare earth doped material, chelated rare earth doped material, semiconductor materials, organic light-emitting materials, conjugated polymers, dye-doped material, and materials containing color centers.

7. (Amended) The laser apparatus of claim 4, wherein said electromagnetic wave source comprises:

a diffuser having a plurality of edges and an emitting surface perpendicular to said plural edges; and

a tunable light-emitter [configured for emitting] operable to emit electromagnetic radiation into at least one of said plural edges such that electromagnetic radiation is scattered and emitted from said emitting surface, said emitted electromagnetic radiation being dispersed along said emitting surface and being generally perpendicular to one of said top and bottom surfaces of said periodic structure, and wherein when said [emitted electromagnetic radiation] predetermined gain magnitude resulting from excitation of said light-emitting medium by said electromagnetic radiation is above said lasing threshold, said periodic structure only [emits electromagnetic radiation] produces laser emission at said predetermined frequency and having a wave vector

substantially normal to at least one of said top and bottom surfaces [thereto].

8. (Amended) The laser apparatus of claim 7, wherein said tunable light emitter comprises at least one LED strip positioned along and corresponding to [said] at least one of said plural edges, each of said at least one LED strips being tunable to provide variable light output.

9. (Amended) The laser apparatus of claim 1, wherein said light-emitting medium is composed of a material adapted to [emit electromagnetic radiation] produce optical gain inside said periodic structure upon application of a charge current thereto, and wherein said variable excitation means comprises:

a plurality of electrodes connected to said periodic structure; and

a tunable electrical power source, connected to said plurality of electrodes for providing said charge current to [the] said periodic structure to excite said light-emitting medium to [emit electromagnetic radiation] produce optical gain inside said periodic structure.

15. A method for producing single mode large-area coherent lasing [utilizing a periodic structure], comprising the steps of:

a) providing a periodic structure of a thickness T and of an average refractive index N, having a top surface [portion] and a bottom surface [portion of a thickness T and having an average refractive index N], said periodic structure having periodic refractive index modulation, between said top and said bottom surfaces, of a predefined amplitude [said periodic structure being configured to produce a photonic mode of a predetermined frequency, said photonic mode being separated from a nearest lower frequency photonic mode by a frequency greater than determined in

Received from < 718 504 4086 > at 4/15/03 11:10:37 PM [Eastern Daylight Time]

accordance with a following expression: c/2TN, wherein c is the speed of light in a vacuum];

b) configuring said periodic structure by selecting said predefined amplitude such that such that said structure produces a photonic mode having a lasing threshold and being of a predetermined frequency, and a plurality of additional photonic modes of different frequencies, wherein said predefined amplitude is selected such that said predetermined frequency is greater than a value determined by a following expression:

$$F_L + c/2TN,$$

wherein F_L is a frequency of a nearest lower frequency photonic mode of said plural additional photonic modes, and c is the speed of light in a vacuum;

c) providing a light-emitting medium disposed within said periodic structure, said light-emitting medium being configured to [emit electromagnetic radiation at said predetermined frequency] produce optical gain when subjected to excitation; and

d) [applying gain to said periodic structure, said gain ranging from a lower gain to a higher gain to cause said light-emitting medium to emit electromagnetic radiation in accordance with the magnitude of said gain when said gain exceeds a predetermined lasing threshold, such that wide-area coherence lasing at said predetermined frequency occurs in a direction perpendicular to said layered structure.] exciting said light-emitting medium to produce said optical gain of a predetermined gain magnitude in said periodic structure, said predetermined gain magnitude being sufficient to meet said lasing threshold, to cause laser emission of a predetermined area to occur at said predetermined frequency in a direction perpendicular to at least one of said top and said bottom surfaces, wherein said predetermined area remains coherent during the single mode lasing when predetermined gain magnitude is selectively increased above said lasing threshold.

Received from < 718 504 4086 > at 4/15/03 11:10:37 PM [Eastern Daylight Time]

21. (Amended) The laser apparatus of claim 4, wherein said electromagnetic wave source comprises:

a diffuser having an emitting surface for contact with said top surface of said periodic structure and having a back surface; and

a tunable light-emitter [configured for emitting] operable to emit electromagnetic radiation into said back surface such that said electromagnetic radiation is scattered and emitted from said emitting surface, said emitted electromagnetic radiation being dispersed along said emitting surface and being generally perpendicular to said top surface of said periodic structure, and wherein when predetermined gain magnitude resulting from excitation of said light-emitting medium by said electromagnetic radiation is above said lasing threshold, said periodic structure only [emits electromagnetic radiation] produces laser emission from said bottom surface at said predetermined frequency and having a wave vector substantially normal to said bottom surface [thereto].

Clean Version of Amended Claims

1. (Amended) A laser apparatus for producing single mode large-area coherent lasing, comprising:

a periodic structure of a thickness T and of an average refractive index N, having a top surface and a bottom surface, said periodic structure having periodic refractive index modulation, between said top and said bottom surfaces, of a predefined amplitude such that said structure produces a photonic mode having a lasing threshold and being of a predetermined frequency, and a plurality of additional photonic modes of different frequencies, wherein said

A3

predefined amplitude is selected such that said predetermined frequency is greater than a value determined by a following expression:

$$F_L + c/2TN,$$

wherein F_L is a frequency of a nearest lower frequency photonic mode of said plural additional photonic modes, and c is the speed of light in a vacuum;

a light-emitting medium disposed within said periodic structure, said light-emitting medium being configured to emit electromagnetic radiation at said predetermined frequency; and

a3

variable excitation means, connected to said periodic structure, for exciting said light-emitting medium to produce optical gain of a predetermined gain magnitude in said periodic structure, said predetermined gain magnitude being sufficient to meet said lasing threshold, such that laser emission of a predetermined area occurs at said predetermined frequency in a direction perpendicular to at least one of said top and said bottom surfaces, wherein said predetermined area remains coherent during the single mode lasing when predetermined gain magnitude is selectively increased above said lasing threshold.

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a4

4. (Amended) The laser apparatus of claim 1, wherein said light-emitting medium is composed of a material adapted to produce optical gain inside said periodic structure upon application of an electromagnetic wave thereto, and wherein said variable excitation means comprises an electromagnetic wave source configured to apply said electromagnetic wave to said periodic structure to excite said light-emitting medium to produce optical gain.

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a5

6. (Amended) The laser apparatus of claim 5, wherein said light-emitting medium comprises one of: rare earth doped material, chelated rare earth doped material, semiconductor

materials, organic light-emitting materials, conjugated polymers, dye-doped material, and materials containing color centers.

7. (Amended) The laser apparatus of claim 4, wherein said electromagnetic wave source comprises:

a diffuser having a plurality of edges and an emitting surface perpendicular to said plural edges; and

G5

a tunable light-emitter operable to emit electromagnetic radiation into at least one of said plural edges such that electromagnetic radiation is scattered and emitted from said emitting surface, said emitted electromagnetic radiation being dispersed along said emitting surface and being generally perpendicular to one of said top and bottom surfaces of said periodic structure, and wherein when said predetermined gain magnitude resulting from excitation of said light-emitting medium by said electromagnetic radiation is above said lasing threshold, said periodic structure only produces laser emission at said predetermined frequency and having a wave vector substantially normal to at least one of said top and bottom surfaces.

8. (Amended) The laser apparatus of claim 7, wherein said tunable light emitter comprises at least one LED strip positioned along and corresponding to at least one of said plural edges, each of said at least one LED strips being tunable to provide variable light output.

9. (Amended) The laser apparatus of claim 1, wherein said light-emitting medium is composed of a material adapted to produce optical gain inside said periodic structure upon application of a charge current thereto, and wherein said variable excitation means comprises:

a plurality of electrodes connected to said periodic structure; and

a tunable electrical power source, connected to said plurality of electrodes for providing said charge current to said periodic structure to excite said light-emitting medium to produce optical gain inside said periodic structure.

G5

15. A method for producing single mode large-area coherent lasing, comprising the steps of:

a) providing a periodic structure of a thickness T and of an average refractive index N, having a top surface and a bottom surface, said periodic structure having periodic refractive index modulation, between said top and said bottom surfaces, of a predefined amplitude;

G4

b) configuring said periodic structure by selecting said predefined amplitude such that such that said structure produces a photonic mode having a lasing threshold and being of a predetermined frequency, and a plurality of additional photonic modes of different frequencies, wherein said predefined amplitude is selected such that said predetermined frequency is greater than a value determined by a following expression:

$$F_L + c/2TN,$$

wherein F_L is a frequency of a nearest lower frequency photonic mode of said plural additional photonic modes, and c is the speed of light in a vacuum;

c) providing a light-emitting medium disposed within said periodic structure, said light-emitting medium being configured to produce optical gain when subjected to excitation; and

d) exciting said light-emitting medium to produce said optical gain of a predetermined gain magnitude in said periodic structure, said predetermined gain magnitude being sufficient to meet said lasing threshold, to cause laser emission of a predetermined area to occur at said predetermined frequency in a direction perpendicular to at least one of said top and said bottom

Received from < 718 504 4086 > at 4/15/03 11:10:37 PM [Eastern Daylight Time]

a6

surfaces, wherein said predetermined area remains coherent during the single mode lasing when predetermined gain magnitude is selectively increased above said lasing threshold.

21. (Amended) The laser apparatus of claim 4, wherein said electromagnetic wave source comprises:

a diffuser having an emitting surface for contact with said top surface of said periodic structure and having a back surface; and

a7

a tunable light-emitter operable to emit electromagnetic radiation into said back surface such that said electromagnetic radiation is scattered and emitted from said emitting surface, said emitted electromagnetic radiation being dispersed along said emitting surface and being generally perpendicular to said top surface of said periodic structure, and wherein when predetermined gain magnitude resulting from excitation of said light-emitting medium by said electromagnetic radiation is above said lasing threshold, said periodic structure only produces laser emission from said bottom surface at said predetermined frequency and having a wave vector substantially normal to said bottom surface.